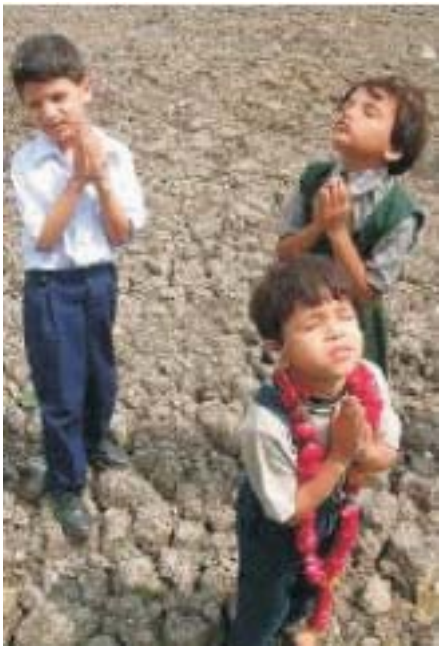
Chapter 5

DROUGHT

What is drought?

The word drought instantly brings images of dry, parched land, no rainfall, crop-failures, starvation and bad living conditions to our mind. In simple terms, drought is a condition of acute scarcity of water, food, fodder and employment due to scanty rainfall in an area. Crop failure is a serious consequence of drought.



For the last 25 years, since the family of Shyamu shifted to Ramgaon, a small village near Bikaner in Rajasthan, the period between July to September every year, has been a time of insecurity, wait and prayer for rains. This is the monsoon period in Rajasthan, which is an arid region.

Almost every other year, the people of Shyamu's village have suffered from the disabling consequences of drought. "We villagers depend on agriculture for our living and when there is no rain we don't have money to buy even food, far from being able to pay school fees. The drought directly or indirectly affects all of us", says Shyamu's father.

The picture shows Shyamu and his friends praying for rain outside their school. The parched land they stand on is dry and cracked. Unfortunately, prayers do not bring rains. Let us find out from this lesson, what this village can do to mitigate drought….

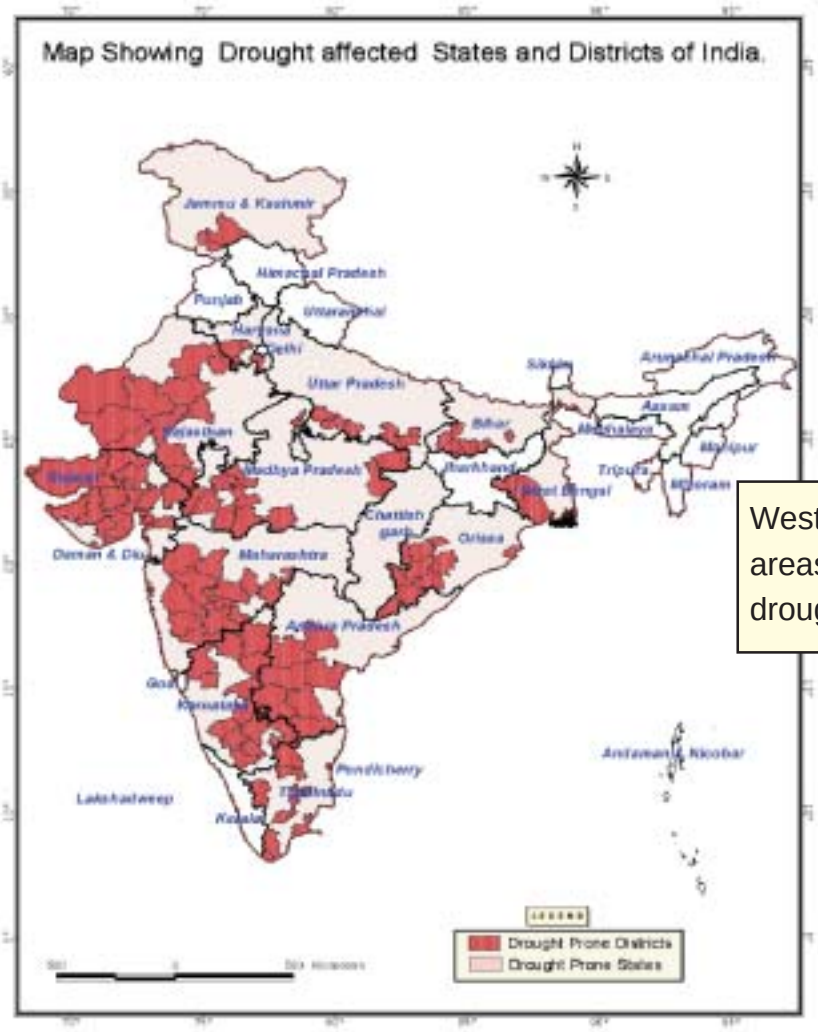
Important Terms

Arid regions: Regions that are dry and receive scanty rainfall, with very little vegetation.

Drought can lead to an acute shortage of drinking water and water for normal domestic needs, caused by deficiency in surface and sub-surface water. This is because scanty rainfall during drought is insufficient to recharge tanks and wells or underground water sources. There is also an acute shortage of water for agricultural operations, including the lack of moisture in soil to grow crops, affecting production. Hence lesser persons would be hired in the farms, leading to unemployment.

Are we all vulnerable to drought, like Shyamu?

Drought is one of the most widespread disasters that India faces, affecting more than 70% of cultivable land. Often, people do not react to drought like they do to other sudden disasters such as earthquakes, cyclones and floods, since drought conditions develop over a period of time, and without immediately perceptible changes to our environment. Hence, drought is called a ***'slow onset'*** disaster.



West Rajasthan and the Kutch areas of Gujarat are chronic drought affected areas.

The western belt including major parts of Rajasthan and Gujarat face frequent drought because of weak monsoons as well as degraded environment.

Among other prominent pockets of drought-prone areas figure Western Orissa and Rayalaseema & Telangana areas of Andhra Pradesh., Chattisgarh, Jharkhand, Central Maharashtra, Interior Karnataka, West Bengal, parts of Tamil Nadu and even water rich states like Punjab, Haryana, Bihar and Uttar Pradesh also experience drought due to insufficient rainfall in certain areas.

In India, 191 districts out of 543 are severely drought prone. In areas that experience drought frequently, the people are more vulnerable to its devastating effects. Two consecutive years of drought means a higher degree of vulnerability in the second year. In 2003, most parts of Rajasthan is said to be experiencing the fourth consecutive year of drought.

Also, certain sections of population living in drought-prone areas are more vulnerable than others. Usually, these sections are people living in rural areas, who depend on agriculture and animal husbandry entirely for a living, or tribals who depend upon forest produce.

Indirect aggravators of Drought?

We have learnt that prolonged scanty rainfall causes drought. In some areas, however, the effects of drought are magnified by other reasons:

Environmental Degradation, especially the loss of green cover affects rainfall received in the region, increasing the possibility of water stress. In areas where vegetation has decreased over the years, rainwater is easily washed away into rivers and the sea, and not retained by the soil, leading to low productivity. Over exploitation of water depletes the source faster than rainfall could recharge it, especially in areas that receive scanty rainfall.

What causes Environmental Degradation?

- ✓ Cutting down trees
- ✓ Soil Erosion
- ✓ Excessive use of ground or surface water
- ✓ Loss of biodiversity
- ✓ Global Warming

Important Terms:

Water-stress: Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use, and stress causes deterioration of fresh water resources

How does drought affect us?

We have learnt that drought results in acute shortage of water, fodder, food and employment. It affects us in different ways.

Drought affects Farmers: It causes loss of crops, lack of fodder and water to feed their cattle

Drought affects Poor Families: Constant drought reduces agricultural production. This leads to insufficient availability or supply of crops in the market. We learn in economics, that when demand is more than supply, the prices increase. Food-grains become costly, and poor people suffer because of inadequate purchasing power.

Drought affects Women: Even today, especially in rural India, women don't have the same status as men in society. This means that they are not given their fair share in access to nutritious food, good living conditions, education, health, etc. In a drought situation, when there is a dearth of food, women who are usually the last to eat at home, eat the least, and hence suffer from malnutrition. Drought also increases their work burden, since they have to work longer to earn the same wages, and often travel longer to fetch water, fodder and fuel-wood.

It affects people living in desert land: They depend more on animal husbandry than on agriculture. Severe scarcity of fodder and water and degradation of vegetation leads to their dependence on assistance from outside, in some areas.

It affects employment: A fall in agricultural production leads to a fall in employment opportunities for rural people who depend on agricultural labour for a living. It also causes people to migrate to other places in search of employment. These are called 'distress migrations'.

Drought affects Children also: Lack of nutritious food in drought affected areas results in malnutrition, which makes them more prone to various infections and diseases. It affects their health and education, since migrations take them away from school and health camps that also provide vaccinations. School-dropouts most often become wage earners, leading to higher child-labour.

Do you know?

Non-availability of moisture over most parts of the year, makes 68 per cent of the land vulnerable to drought in India. In 2001, more than eight states suffered the impact of severe drought. Find out how many states are afflicted by drought conditions this year... and mark them on a map of India.

Coping with Drought....

We have learnt that drought is a slow onset disaster, and hence gives us ample time for mitigation, preparedness and response, unlike sudden disasters.

We know that drought is a result of multiple causes, the main indicator and cause being abnormally low rainfall. The Indian Meteorological Department tells us the duration and quantity of rainfall expected every season, but this being a natural phenomena, is beyond our control. We can however make planned efforts to conserve natural resources, and prevent misuse of land and water.

Fact:

There is over 100 million hectares of degraded land in the country. Protecting, regenerating and restoring degraded land can reduce the pressure of population on cultivated land and keep forests and pastures safe to supply fodder for the animals.

Hence, while we cannot prevent drought, we can certainly reduce its intensity and impact through individual and collective actions. It is important to remember that any steps taken to mitigate or prepare for drought have to be sustained for a long period of time, and must involve a cross-section of people such as community, Panchayat representatives, volunteers, government functionaries, teachers and students. Let us now see how we can help.

Important Terms:

1. ***Degraded land:*** where crop yield is reduced due to various reasons such as pollution of top soil, soil-erosion, over exploitation, cropping patterns, etc.

Long- term Drought Mitigation Strategies

- ✓ Construction of Community Based Rain Water Harvesting Structures
- ✓ Promoting Watershed Programmes
- ✓ Increasing Forest cover through plantations
- ✓ Adopting drought resistant varieties of paddy and other crops
- ✓ Using alternative crops in drought conditions
- ✓ Capacity building of communities in Drought Management and introducing livelihood options besides agriculture and animal husbandry which are water intensive
- ✓ Encouraging crop and Seed insurance schemes

What can we students do?

1. **Conserve water**: Prevent misuse and wastage of water, and encourage recycling of water. Set up a Water Management Committee in your school and take turns to be members. Can you list three ways of recycling domestic water? (In cities, using water from a washing machine to wash your home and car is an example. In rural areas, directing water from the wash area to the fields or garden is another)
2. **Harvest Rain water** at home and in schools: Find out how you can collect rain water and store it, or use it to recharge a well, bore-well source or sump. Can you use your school as a model for roof-top rain water harvesting in your area?
3. **Plant trees and care for them**: Carry out campaigns for plantations. Find out the right trees for your area. This information will be available with the horticulture, forest or agriculture department or VAW if in rural areas. E.g. Eucalyptus trees must never be planted in dry areas, since they absorb all the water around them

Important Terms:

1. ***VAW :*** Village Agricultural Worker, responsible for disseminating information on crops, irrigation, pest-control, etc

ACTIVITIES

4. Create Awareness:

- Find out about the various Government Schemes meant to help people in drought-affected areas, and help your village or area to understand how to make use them. Take the help of your teachers to contact Government functionaries to find out what are the right crops to grow in your area, and what alternative crops can be grown in drought conditions. Also try and list what alternative employment or livelihoods people can seek when drought disables their normal living. Make charts to display this information in prominent places

- Make charts to disseminate information on water conservation and harvesting. Also create awareness on important Do-s and Don't-s before and during drought.

5. **Help your DMT:** We are now familiar with the DMT. Find out if there is a DMT in your village or area. Ask if a Community Contingency Plan for drought exists. Ask how you can help the various task forces. Does it use an early warning system?

6. **Make a chart to show important Don't-s in drought prone areas. Add to the list below:**

Don't
▶ Misuse or waste precious water
▶ Destroy natural vegetation such as forests, pastures, trees, etc
▶ Overgraze domestic animals
▶ Grow water-loving plants in water scarce areas
▶ Promote monoculture, and encourage mixed cropping

Historically, conservation of water has been a traditional practise in India.....

In the western and central Himalayas, diversion channels – 'guhls' were built to draw water from hill streams or springs. The length of these channels varied from 1 to 15 km, and carried a discharge of 15 to 100 litres per second.

In Meghalaya, bamboo pipes are used to tap spring water for irrigation, which finally reduces to 20 - 80 drops per minute at the site of the plant, functioning like a drip irrigation system.

The 'ahar – pyne' system of irrigation is prevalent in south Bihar. Ahars are rectangular catchment basins, and pynes are channels built to utilise the water flowing from the seasonal streams.

'Kunds' in the Thar desert, are covered underground tanks with an artificially prepared catchment area to improve run-off. The structure is shaped like a bowl with a lid

In the Malabar area, a 'Surangam' is a tunnel dug through a laterite hillock, from which water seeps out and collects.

Do you know if there are any traditional methods of water conservation in your village or area?

Can we now list out what Shyamu's village and other drought-affected people in India can do to mitigate the effects of drought?

We have learnt that while the natural causes of drought cannot be controlled, the impact of its effects on our lives, livelihoods and environment can certainly be reduced. "…..if care is taken and conservation becomes our way of life, even the desert can bloom. In future the needs of our country will be met and once again we can look forward to economic development for all. Being prepared and knowing what to do is necessary and each one of us can play a very important role in helping..."

M. S. Swaminathan, Eminent Agricultural Scientist

How much water can we conserve at home?

Do a simple calculation to find out:

The amount of water that you can conserve depends on the area of your roof and the amount of rainfall that your area receives on an average. Thus the amount of water you can conserve can be calculated using the following formula:

Volume of water (V) = Area of House (A) x Amount of rainfall (R) x

Efficiency factor (f)

The efficiency factor (f) denotes the efficiency of rainwater collection in your house (it is a % always less than 100%).

Thus for a house of 200 square metres roof area, and average rainfall of 70 cm and an efficiency factor of 50%, the volume of water that you can collect is

V =A x R x f

= 200m² x 0.7m x 50% = 70 m^3 which is 70,000 litres of water.

If **N** is the number of members of the family, and **w** the amount of water needed per person, then the total water needed by the family in a day is

W = N x w

If we assume that each person needs 100 litres a day (try and calculate how much water you consume in a day), and we assume that the family has 5 members, they need 500 litres per day.

Now we can calculate the number of days of water supply this family can enjoy from harvested rainwater as

D = V/W

=70,000 (litres) / 500 (litres/day) = 140 days

So this family can use rainwater conserved at 50% efficiency for their household needs for 140 days in the year, which is more than 4 months of the year!

For your family:

A : Roof area to drain rainwater = _____ m²

R : Average rainfall/year for your area = _____ cm

f : Efficiency Factor = _____ %

V=A x **R** x **f**

N : Members of the family = _____persons

w : Amount of water needed per person = _____litres

W: Total water needs of your family/day =_____ litres (**N** persons***w** litres)

D = V/W

Important Terms:

1. ***Discharge:*** the volume of water that passes a given location within a given period of time. Usually expressed in cubic feet per second.
2. ***Drip-irrigation:*** a common irrigation method where pipes or tubes filled with water slowly drip onto crops. Drip irrigation is a low-pressure method of irrigation and less water is lost to evaporation than high-pressure spray irrigation.
3. ***Run-off:*** Runoff is water flow in the topsoil layer. Runoff reaches water bodies after it falls as rain and is discharged from the area
4. ***Laterite:*** A kind of soil or rock that water can percolate through. The water carrying capacity of laterite is very low, and hence is unsuitable for cultivation of major crops.
5. ***Monoculture:*** The use of land for growing only one type of plant. The practice of monoculture on a landscape has an effect that is the opposite of biodiversity, and can sometimes be responsible for the spread of plant diseases
6. ***Aquifer:*** a geologic formation that is water bearing, that stores and/or transmits water, such as to wells and springs. These water-bearing formations are capable of yielding water in sufficient quantity to constitute a usable supply for people.

EXERCISES

1. Choose the right answer to the following questions

   I. The greatest amount of fresh water on the Earth is found in:_____
      a. theoceans
      b. ice caps and glaciers
      c. aquifers
      d. surface water

   II. Groundwater is: _____
      a. not usable because it is dirty
      b. another name for watershed
      c. too far beneath the Earth's surface to be used
      d. another name for an aquifer

   III. Surface water: _____
      a. is used to produce electricity
      b. can be easily contaminated
      c. can be used for recreation
      d. all of the above

2. How does drought affect our lives?
3. List ways to conserve water in day to day use.
4. What actions will help us to mitigate drought, individually as well as collectively?
5. What do you understand by rainwater harvesting?